PRIORITY:

Translating Research From Bench to Bedside to Community

Natural History and Epidemiology

Information Dissemination

AREA OF EMPHASIS

Natural History and Epidemiology

FY 2015 RESEARCH PRIORITIES

- Conduct epidemiologic studies of HIV/AIDS prevention, treatment, and care interventions at population levels through the use of individual, dyadic, health system, community, and population-based approaches.

  This priority includes the development and maintenance of HIV cohorts and appropriate controls, demographic-based approaches, multilevel observational studies, analysis of electronic medical or health records, and community randomized study designs.

- Conduct studies to improve the implementation of research findings into diverse health care practices for HIV/AIDS and related comorbidities.

  This priority includes advancing the methodologies of implementation science and conducting implementation science studies that maximize program effectiveness by addressing organizational and system-level barriers to the scale-up of prevention and treatment interventions. This priority also includes interventions studies in diverse settings and underrepresented populations, and studies evaluating the economic impact (cost-effectiveness) of interventions.

- Develop novel methods and perform the next generation of transdisciplinary HIV research.

  This priority includes transdisciplinary methods to examine the prevention, testing, and treatment cascade by integration of data from electronic medical records, observational studies, clinical trials and simulation, mathematical modeling, and molecular epidemiology.

- Conduct studies that assess epidemiologic aspects of HIV infection across populations from infancy through older adulthood.

  This priority includes the study of the long-term effects of HIV disease, the drivers of HIV-related disparities, common coinfections, and noncommunicable disease (NCD) comorbidities in populations who are aging with HIV.

OBJECTIVE–A: Transmission of HIV (Prevention, Risk Factors, and Mechanisms)

Further characterize the relative importance of major risk factors, population-attributable risk, and mechanisms of HIV susceptibility and transmission in domestic and international settings to guide prevention and treatment strategies.

STRATEGIES

Strategies Related to HIV Transmission, Prevention, and Care

- Study the seek, test, treat, and retain approach, both alone and in combination with other prevention interventions, using epidemiologic, mathematical, and simulation models and cost-effectiveness analyses.
- Evaluate new strategies to increase the uptake of HIV testing in at-risk and affected populations, including use of social network strategies, provider-initiated testing and counseling ("opt-out" approach), home-based testing, home self-test kits, financial incentives, Web-based and mobile technologies, and other novel strategies.
- Use novel epidemiologic methods to quantify the impact of widespread antiretroviral therapy (ART) availability, adherence, pre-ART and ART retention in care, early versus late treatment initiation, HIV-related and aging-related comorbidities, and patterns of antiretroviral (ARV) resistance on HIV prevalence, incidence, community-level viral load, risk behaviors, long-term care retention, and the transmission of resistant HIV strains.
- Utilize existing cohorts, develop new cohorts of selected subpopulations, and employ novel methods (e.g., social/sexual network analysis, molecular epidemiology and epigenetics, temporal phylogenetic analyses, geographic information systems, and mobile technologies) to further assess the magnitude of HIV incidence and risk factors for HIV transmission.
- Develop molecular and other methods and conduct studies to estimate incidence, prevalence, and correlates of divergent viral genotypes and recombinants, drug resistance, and neutralization profiles and their temporal trends; characterize how different HIV types, subtypes, and recombinant forms may influence superinfection, response to ART and other biomedical interventions, and emergence of ARV-resistant viruses.
- Incorporate measures such as community viral load (CVL) into population-based samples such as demographic and health surveys and AIDS Indicator Surveys.
- Refine epidemiologic and mathematical models to improve estimates of per-exposure risk of HIV transmission and to develop estimates of population-attributable risk, based on type of sexual and/or other exposure, characteristics of the infected and uninfected partners, cofactors (such as substance use), and biomedical interventions.
- Investigate viral, host, and environmental characteristics that distinguish high-efficiency transmitters and non-transmitters of HIV, through studies of serodiscordant partners, sexual and/or molecular network-based studies, simulations, and other strategies.
- Conduct epidemiologic modeling studies on the aggregate impact of factors such as frequent testing, early ART, pre-exposure prophylaxis (PrEP), postexposure prophylaxis (PEP), topical microbicides, and male circumcision on HIV transmission in the presence or absence of other biomedical, behavioral, and structural interventions.
- Study the effect of endogenous and exogenous sex steroids on the risk of HIV transmission and the mechanism by which hormonal contraception may alter the risk of HIV transmission.
- Evaluate the risk of sexual and blood-borne HIV transmission in relation to the following:
  - Viral factors such as viral quantity, diversity, coreceptor usage, genotype, and dual virus infections in various body compartments and mucosal compartments such as the oral mucosa, the female genital tract, and the anorectal mucosa;

- Host factors such as age, sex, race, socioeconomic status, functional capacity, strength and breadth of immune response, comorbid diseases, coinfections, transfusion, and presence of other highly prevalent NCDs;
- Host genetics, including genome-wide association and genome sequencing studies;
- Modifiable factors such as food security, diet, and nutritional status; geographic location; age at sexual debut; drug, alcohol, and tobacco use and treatment; mental health; housing; circumcision status; societal acceptance/stigma, sexual risk, and behavioral interventions; and linkage to, retention in, and use of health care barriers to unveiling risk behaviors in the health care setting;
- Other infections, including *Mycobacterium tuberculosis* (TB) and drug-resistant strains, multidrug-resistant (MDR)- and extensively drug-resistant (XDR)-TB, *Plasmodium* sp. (malaria), sexually transmitted infections (STIs), viral hepatitides and antibiotic-resistant bacterial infections, and the broader microbiome;
- Psychological, behavioral, social, cultural, geographic, and structural determinants of susceptibility to HIV acquisition among hard-to-reach and vulnerable populations;
- Sexual activity, pregnancy, sexual networks, partner choice, partner concurrency, partner fidelity, sexual partner violence, duration of partnership, physical and virtual venues for meeting sexual partners, sex trade, and control of STIs; and
- Hygienic practices such as douching (vaginal and rectal), contraception practices, and cultural practices such as the use of traditional vaginal and rectal preparations.

- Further refine the timing, mechanisms, and risk factors in perinatal and postnatal mother-to-child-transmission (MTCT) of HIV. These studies include:
  - Assessing the clinical outcomes, cost, and cost-effectiveness of different strategies for prevention of MTCT (PMTCT), including the access and provision of timely maternal ART, immediate ART in very high-risk neonates, and safe breastfeeding and formula feeding;
  - Studying efficient practices and barriers to HIV testing of the mother during prenatal care, labor, and of the infant after birth;
  - Assessing the impact of maternal and infant ARV regimens of different potency and duration on (1) MTCT, (2) the overall health of women and their HIV-infected and uninfected children, (3) the emergence of ARV drug resistance in the mother and in those infants who become infected despite prophylaxis, and (4) programmatic uptake, adherence, retention, and costs;
  - Studying the safety, effectiveness, and efficiency of sustainable approaches to PMTCT, and determining the effects of such approaches on infant growth, cognitive/behavioral development, morbidity, and mortality;
  - Studying strategies for maternal ART and prophylaxis in settings where limited or no laboratory monitoring may be available;
  - Assessing the impact of subsequent pregnancies after HIV diagnosis and enrollment in HIV care on loss to care and risk of MTCT.
- Conduct studies to assess the individual and public health value of prevention programs that promote widespread, frequent HIV testing and linkage to care, including voluntary HIV couples counseling and testing and partner notification with immediate linkage to counseling, care, and ART; and self-testing and opt-out programs.
- Identify the multilevel determinants of low CD4 at enrollment into care and ART initiation, with a focus on modifiable factors at the clinic level, contextual level, and individual level.
- Assess the efficacy, effectiveness, efficiency, and long-term sustainability of individual and various combinations of prevention strategies (e.g., behavioral changes, partner/couple testing and notification, biomedical interventions such as PrEP and PEP, and treatment for coinfections and comorbidities) in different populations, regions, and risk groups.

OBJECTIVE–B: Disease Progression (Including Opportunistic Infections [OIs] and Malignancies)

Use epidemiological research, including research through the use of electronic medical records, in domestic and international settings, to identify the effectiveness, impact, and interactions of HIV-related therapeutics, biological factors, behaviors, and community/policy-level factors (e.g., HIV testing coverage, impact of the Affordable Care Act) in relation to HIV progression, response to ART, and development of non-AIDS-defining chronic conditions, as indicated by virologic, immunologic, and clinical outcomes.

STRATEGIES

Strategies Related to HIV Disease Progression and Response to ART

- Develop new cohorts and maintain ongoing enrollment and long-term followup of existing cohorts to determine the changing spectrum of HIV disease coinfections and comorbidities; identify highly exposed uninfected persons, long-term non-progressors, and elite suppressors. Develop accurate and uniform definitions that may be applied across cohorts for multicohort analyses.
- Characterize short- and long-term consequences of recent HIV infections on HIV disease progression, including the roles of host and viral genetic characteristics and different routes of exposure; continue to characterize the epidemiology of HIV/AIDS early in infection, and in individuals who have experienced ART failure.
- Determine, using different epidemiologic study designs, the effects on disease progression of cumulative and current ART exposure to specific drugs; classes of drugs; drug combinations, including drugs for coinfections; and treatment strategies and laboratory monitoring overall and by sex and age groups.
- Characterize global patterns of innate and acquired viral resistance to ART and how these patterns influence the long-term effectiveness and cost-effectiveness of monitoring strategies and therapies.
- Characterize the changing spectrum of clinical outcomes, causes of morbidity and mortality, complications of ART, and cost patterns associated with evolving therapeutic strategies, in relation to person, medication, and system-level factors.
- Characterize the scope of use and anticipated changes in the cost and cost-effectiveness of care as more ARV formulations move from patented to generic type; evaluate how differences in the generic regimens influence use, adherence, and efficacy.
- Use observational studies in resource-limited settings to estimate the HIV prevalence, incidence, and correlates of treatment failure in first-line, second-line, and subsequent treatment regimens.
- Assess the effect of ART on the incidence, pathogenesis, and presentation of cancers and other noncommunicable diseases, and use mathematical models to project the frequency, and outcomes of treatment for these cancers.
- Characterize the long-term effect of HIV infection on the central nervous system, including the effect of viral burden in the cerebrospinal fluid and its effect on white matter degeneration, and differentiate these changes from other neurocognitive diseases, such as dementia and Alzheimer's disease.
- Evaluate and characterize immune reconstitution inflammatory syndrome (IRIS), including modifiable (e.g., the oral and gut microbiota) and non-modifiable predictors of immune recovery, and determine best treatment practices for IRIS in diverse populations.

Strategies Related to HIV Disease Progression and Comorbidities

- Define the prevalence, incidence, predictors, potential treatments, and consequences of HIV comorbid disease, including each comorbidity's estimated loss of life years and quality of life. Use mathematical models to project the frequency, outcomes, and treatment costs of these comorbidities in HIV survivors.
- Expand research on the spectrum of AIDS-defining malignancies and on non-AIDS-defining malignancies that may develop in HIV-infected patients who have responded to ART and are living longer.
- Identify effective and cost-effective screening strategies for such malignancies in HIV-infected populations.
- Identify host genetic differences in susceptibility to HIV-related complications and comorbidities by including classical, genome-wide association and genome sequencing methods.
- Investigate the role of risk factors such as chronic inflammation in the development of malignancies and noninfectious comorbidities in HIV-infected individuals, and how cumulative and current ART use, smoking, alcohol, and frailty might mediate the effects of chronic inflammation.
- Determine the influence of locally endemic diseases on markers used to predict complications of HIV, including lymphocyte subsets, activation markers, and hematologic and clinical chemistries.
- Develop and evaluate affordable diagnostic and clinical indices for comorbidities for tailoring care to individual risk in resource-limited settings.
- Assess the ability of health care systems in resource-limited settings to screen, diagnose, and treat individuals with AIDS-defining and non-AIDS-defining malignancies. Conduct analyses to evaluate "packages" of screening and treatment interventions for noncommunicable, high-burden diseases.
- Investigate TB/HIV interactions, including the effects of dual infection on the progression of both TB and HIV.
  - Investigate new approaches to successful diagnosis, as well as linkage to and retention in care of patients who are coinfected with HIV and TB.
  - Investigate the MDR/XDR-TB epidemic among HIV-infected patients, evaluating risk factors for MDR/XDR-TB prevalence, incidence, therapeutic options, and clinical outcomes for prophylaxis and treatment strategies.
  - Investigate the prevalence of disseminated (miliary) TB disease, including cerebral TB, its impact on everyday function, disease progression, and therapeutic options among HIV-infected patients.
  - Assess methods of integrating TB and HIV diagnostics, prophylaxis, care, and adherence, as well as other prevalent HIV-associated comorbid conditions, and their effects on survival, quality of care, cost, and cost-effectiveness of care.
  - Investigate the feasibility, effectiveness, and cost-effectiveness of screening for and treatment of latent TB on the epidemiology of HIV and TB coinfection in endemic countries.
  - Conduct implementation science research to understand barriers to implementation of preventive therapy and treatment of active TB in HIV and TB-coinfected patients.
- Evaluate the clinical and economic impact of treatment of smoking; alcohol and drug use, abuse, and dependence; and mental health disorders on the effectiveness, cost-effectiveness, and consequences of ART, HIV disease progression, development of comorbidities, and mortality.
- Support research efforts to link existing medical record systems and clinical, observational, and surveillance databases to enhance the understanding of HIV/AIDS outcomes in populations and in standard-of-care cohorts.
- Study the frequency, changing manifestations, and effects of HIV-related respiratory disease on morbidity, mortality, and HIV disease progression, in both untreated patients and those receiving ART.

- Study the emergence and reemergence of infectious diseases and the clinical and epidemiological characteristics of antimicrobial-resistant infections in HIV-infected populations.
- Estimate the prevalence of specific human papillomavirus (HPV) types associated with cervical, anal, and oropharyngeal cancer and pre-cancer in HIV-infected individuals.
- Evaluate different cervical and anal dysplasia and cancer identification and treatment methods in HIV-infected individuals for sensitivity, specificity, cost-effectiveness, and appropriateness.
- Evaluate the effectiveness and cost-effectiveness of HPV vaccines and barriers to their uptake among HIV-infected individuals from geographically diverse regions.
- Assess the effect of various primary care screening and interventions on HIV disease outcomes, survival, and costs of care.
- Investigate hemostatic disturbances in HIV-infected individuals and the role of coagulation and fibrinolytic mechanisms in risk of vascular events and other complications.
- Examine the impact of cryptococcal disease on early mortality, and evaluate strategies (including novel point-of-care antigen testing) for prevention and early detection of cryptococcal disease in HIV-infected individuals.

Strategies Related to HIV Disease Progression and Pediatric Populations

- Evaluate the differences in adherence and HIV outcomes between adolescents, adults, and perinatally infected children; in behaviorally acquired versus perinatally infected adolescents; and in adolescents treated in pediatric versus adult HIV treatment centers.
- Investigate the long-term outcome of both HIV and ART in perinatally HIV-infected infants and children as these children reach adolescence and adulthood. Determine whether a premature aging phenotype exists in these individuals as they enter the third and fourth decades of life.
- Assess the long-term impact of perinatal HIV and ART exposure in HIV-uninfected infants, children, and adolescents born to HIV-infected mothers.
- Study the effect of the health status of HIV-infected mothers and of ART during pregnancy, lactation, and early child life on survival, quality of life, and care costs of their HIV-infected and -uninfected children and on maternal outcomes. This strategy includes studies of reproductive and pregnancy outcomes.
- Study HIV-infected and -uninfected children and adolescents to determine factors related to impaired growth and neurodevelopment; cognitive, behavioral, and psychomotor development; impact of other childhood infectious diseases and nutritional status; and safety and efficacy of immunizations.
- Develop appropriate epidemiologic and surveillance studies to assess the immunologic responses to routine vaccinations of childhood and adolescence and the need for altered vaccine schedules in HIV-infected youth.
- Assess the risk factors for acquisition and natural history of HPV infection, and the impact of HPV vaccines in HIV-infected children and adolescents.
- Optimize ART monitoring strategies for settings where the World Health Organization Option B+ PMTCT strategy will be deployed widely.

Strategies Related to HIV Disease Progression, Aging, and NCD Comorbidities

- Investigate the relationship between HIV infection and the spectrum of physical and mental health outcomes that increase with aging.
- Study the incidence and determinants of physical, neurologic, and cognitive changes by age group and by duration of HIV infection and treatment among HIV-infected individuals and the linkage between frailty and functional impairment and HIV, ART use, response, and self-care behaviors.

- Study the epidemiologic association between immunologic and virologic responses to treatment and adverse effects of HIV and ART in aging populations, including those with coexisting morbidities or who receive numerous medications for other conditions.

- Characterize the long-term effects of HIV and HIV-associated conditions on multimorbidity, polypharmacy, and frailty. Develop means of incorporating these phenomena in analyses focused on solid organ systems or specific functions, including cognition and immune function.

- Examine the impact of polypharmacy in older HIV-infected individuals, including its effects on toxicity and adherence to and prioritization of critical drug regimens.

- Evaluate immunologic and virologic measures of HIV disease progression, ART-related toxicities, development and progression of comorbid conditions, and mortality in older versus younger adults receiving ART. Develop and validate indices that integrate these measures to predict important clinical outcomes, including all causes of mortality.

- Conduct studies of HIV and NCD comorbidities in the ART era, in high as well as low- and middle-income countries.

OBJECTIVE–C: Methodologies

Develop and evaluate methods and resources for HIV/AIDS epidemiological and clinical studies that use culturally appropriate approaches; incorporate new laboratory and statistical methods; better utilize information systems by complementing existing data; and better integrate research findings into clinical practice and regional, national, and international policies and guidelines.

STRATEGIES

- Evaluate and promote the use of multiple study designs that incorporate appropriate ethical, cultural, and policy context for studies of HIV/AIDS prevention, diagnosis, and treatment in diverse domestic and international populations.
- Evaluate study designs, including adaptive trials that more efficiently assess the effectiveness of prevention and treatment interventions and studies conducted in typical service delivery settings.
- Continue to support local, regional, and international collaborations to integrate, harmonize, and utilize existing data.
- Capture and utilize data from large U.S. and international HIV screening programs, such as blood donor screening programs, to monitor HIV incidence and temporal trends, viral genotypes, drug resistance, and neutralization profiles.
- Ensure that the population composition of domestic epidemiological and intervention studies is representative of populations at risk for and affected by HIV/AIDS, such as women, older Americans, persons from geographical regions most affected by the epidemic, adolescents and young adults, men who have sex with men and other sexual minorities, racial and ethnic populations, drug and alcohol users, persons with mental illness, and persons affected by other comorbidities.
- Ensure that studies reflect the needs and priorities of the countries or regions in which they are conducted and produce results that are quantifiable and applicable to diverse circumstances and geographic areas.
- Explore expanded utilization of new diagnostics designed for use at the point of care, which have potential to address access, disparity, and confidentiality issues for people at risk for or infected with HIV, especially in underserved areas and in stigmatized populations.
- Promote the development and dissemination of point-of-care tools appropriate for both industrialized and resource-limited settings to standardize the diagnosis and monitoring of treatment-limiting or life-threatening complications of chronic HIV infection and ART.
- Investigate the use of Internet-based or other mobile technologies (such as smartphones) as methods of recruitment, risk assessment, research education, and preventive interventions for HIV.
- Characterize HIV transmission dynamics among minorities (e.g., young sexual minority status populations) by using network analysis and similar techniques that identify and quantify network factors and related drivers of racial, ethnic, and sexual disparities; target such network factors for HIV testing and prevention interventions.

Strategies Related to Natural History Diagnosis and Monitoring

- Further develop epidemiologic, laboratory-based, and simulation modeling methods in conjunction with prospective cohort studies, domestically and internationally, to monitor HIV incidence, response to ART, and the incidence of complications of HIV infection and of chronic use of ART, including:
  - Develop and test methods to produce accurate, reproducible, and inexpensive virologic, immunologic, bacteriologic, mycologic, pharmacologic, neurobehavioral, and genetic assays suitable for large-scale epidemiological research and surveillance in resource-limited

settings. Emphasis should be on simple and reliable staging of disease progression for the initiation and monitoring of ART and OI prophylaxis, viral hepatitis testing, HIV resistance testing, TB screening, and assays for STIs and other coinfections.

- Effectively utilize ongoing and newly developed cohort studies, domestic or international specimen repositories, and databases for interdisciplinary HIV-related studies to address short-, medium-, and long-term outcomes. Encourage collaborative studies between cohorts and nested studies that utilize these resources.

- Develop uniform assessment tools to measure host and environmental characteristics, including food insecurity, malnutrition, substance abuse, and mental health, which may affect immediate and longer-term HIV-related health outcomes. Assessment tools should be both culturally appropriate and scientifically valid and made available for other researchers to assess, validate, and use.

- Develop new and evaluate existing assays to accurately measure HIV incidence at a population level, using rapid, inexpensive, and reproducible measures, including methods appropriate for resource-limited settings.

Strategies Related to Research on Study Design and Analysis of Epidemiologic Data

- Develop new epidemiological designs and statistical methods, and informatics tools and simulation, to better characterize HIV, STI, and hepatitis C virus (HCV) and other blood-borne infections and other coinfections transmission dynamics, and monitor long-term trends in disease progression and development of toxicities in the setting of potent ART.

- Continue to develop and improve upon quantitative methods for making effective and appropriate use of data from local, State, national, and international HIV/AIDS,TB, STI, and HCV and other blood-borne infection surveillance systems and from large observational studies, such as:

  - Methods to assess costs of care for HIV disease management and treatment of comorbidities, both domestically and internationally;

  - Methods for inferring causal effects of nonrandomized exposures (e.g., treatment and policy changes);

  - Methods for estimating HIV, TB, STI, and HCV and other blood-borne pathogens, and other coinfections incidence rates in cross-sectional samples;

  - Methods for sampling hidden populations (e.g., venue-based, Internet-based, mobile-phone-based, snowball, mixed method, respondent-driven, and time-location sampling);

  - Methods for standardizing the reporting of results from studies with novel recruitment and access approaches (e.g., Internet- and mobile-technology-based) and/or using respondent-driven sampling;

  - Models and inferential methods for characterizing multiple/comorbid disease processes and events;

  - Methods for linking cohort data to health care utilization and cost data to address health policy questions;

  - Methods for compiling and linking blood donation data across blood centers, and estimating trends in incidence and transfusion-transmitted risks for HIV;

  - Methods for simultaneously addressing more than one hypothesis or intervention, including the use of factorial randomized trials and quasi-experimental designs;

  - Methods for collecting and analyzing spatio-temporal data (including geo-sentinel mapping), especially as they relate to transmission and spread of HIV infection;

  - Methods for multilevel analysis of population-based HIV/AIDS surveillance data;

  - Research that explores how to increase utilization of population-based HIV/AIDS surveillance data and expand access to these data sources; and

  - Development of robust data presentation tools that can incorporate data from multiple sources for exploration by non-epidemiologists/statisticians.

- Encourage research on innovative design and analysis through interdisciplinary collaboration between methodologists from different fields, such as epidemiology, biostatistics, geospatial sciences, econometrics, computer science, biomathematics, decision sciences, implementation science, health services, behavioral and social sciences, and demography.

- Conduct studies that make innovative use of existing data for well-designed, rigorous analyses, hypothesis generation, and hypothesis testing.

- Promote collaborative studies using genetic epidemiology methods (e.g., genome-wide association studies, and epigenetic methylation studies) applied to large, diverse populations to elucidate mechanisms of HIV infection, disease progression, and complications.

Strategies Related to Interventions

- Study and evaluate prevention packages that combine multiple strategies into one intervention or packages of interventions, especially those that combine behavioral, biomedical, and structural interventions.

- Develop novel approaches to mathematical and simulation modeling to address the challenges posed by combination prevention packages, and promote methods for communicating such models.

- Develop studies to compare effectiveness, efficacy, and cost-effectiveness of various HIV prevention strategies within and between populations with generalized or concentrated epidemics.

- Assess algorithms for HIV diagnosis and linkage to care, including point-of-care algorithms; diagnosis of acute HIV infection, acute STI, HCV, and other blood-borne infections; and strategies for retention in and adherence to treatment and prevention programs.

- Assess the effectiveness and outcomes of clinical and laboratory monitoring for the initiation, monitoring, and switching of ART, particularly in resource-limited settings.

- Use appropriate clinical and laboratory definitions of short- and longer-term ART failure, and mechanisms for monitoring drug resistance evolution in HIV types, subtypes, and variants in domestic and international populations.

- Develop, evaluate, and promote new, improved, and cost-effective methods and strategies to prevent HIV transmission via blood transfusion, tissue and/or organ transplantation, and other medical interventions in resource-rich and resource-limited settings.

- Assess the impact and cost-effectiveness of different strategies for HIV testing and counseling and linkage to/maintenance of care for different populations, including adolescents, older adults, racial and ethnic populations, vulnerable and displaced populations, and populations in diverse domestic and international settings.

- Develop effective programs to promote routine HIV retesting of high-risk populations.

- Validate the use of surrogate markers for HIV acquisition and transmission risk, including use of behavioral measures and biomedical markers.

- Assess the effectiveness of strategies designed to reduce the impact of HIV comorbidities, including smoking cessation, medication-assisted treatment for substance abuse, mental health treatment, HCV treatment, vaccination against hepatitis B virus and HPV, and cytologic screening for cervical and anal cancers.

- Conduct studies on the impact of mobile-device-supported (mHealth) interventions on HIV outcomes in different domestic and international settings.

- Adapt interventions initially developed in older adults to HIV-infected individuals with multiple comorbidities, functional impairments, polypharmacy, cognitive decline, and/or who are at risk of adverse outcomes common in geriatric populations.

Strategies Related to Implementation

- Conduct implementation science studies and population-based research necessary for translating epidemiology findings into practical guidelines for health care practices.
- Evaluate various operational strategies for implementation of efficacious, preventive, or therapeutic interventions, and evaluate countrywide ART programs and the use of implementation science research and integrated observational databases to assess effectiveness at the community and population levels.
- Evaluate novel methods for rapid dissemination of successful and reproducible findings for implementation into the field. This includes improving the understanding of how to efficiently deliver effective interventions, develop standardized methodologies to transfer interventions from one setting to another, and make informed choices among different interventions.
- Design and implement evaluations of both targeted and large-scale HIV testing, prevention, treatment, and retention programs, with attention to clinical outcomes, HIV incidence rates, viral resistance, long-term dynamics of the HIV epidemic, and comparative costs for programs relative to current strategies.
- Utilize implementation science to improve the operations and efficiency of a proven strategy or treatment and to determine to what degree it is scalable and applicable across a broad range of target populations.
- Evaluate the long-term clinical and public health impact, cost, and health care utilization ramifications of different strategies for care, including treatment of HIV-associated conditions and comorbidities, ART, and complications of ART.
- Assess the use of CVL or other markers of success in viral suppression as a population-level marker of program effectiveness. Establish CVL sensitivity, specificity, and predictive value in tracking the epidemic, allocating resources, and evaluating the effectiveness of HIV prevention and treatment programs.
- Design and evaluate implementation of system-level approaches for management of complex HIV-associated comorbidities and other noncommunicable diseases in settings or populations with limited available care.
- Evaluate different models of developing a continuum of screening, prevention, treatment, and care and the impact of expanded intervention availability, access, and coverage in various settings and populations.

AREA OF EMPHASIS

Information Dissemination

SCIENTIFIC OBJECTIVES AND STRATEGIES

OBJECTIVE–A: Disseminate Information to all Constituencies

Support the effective dissemination, communication, and utilization of information about HIV infection, AIDS, coinfections, opportunistic infections, malignancies, and clinical complications to all constituent communities of the NIH, domestically and internationally.

STRATEGIES

- Rapidly disseminate new basic, translational, and clinical research findings, including information on the potential implications for HIV prevention, care, and treatment, using existing and innovative methods.
- Promote study designs that include plans for dissemination of appropriate and relevant findings to study participants, health care practitioners, community representatives, policymakers, program administrators, and the public, while ensuring that confidentiality of efficacy and safety data is maintained during the conduct of clinical trials.
- Facilitate the update and dissemination of HIV prevention and treatment guidelines based on the latest clinical research findings.
- Utilize computer and other information dissemination technology (including the Internet) to disseminate up-to-date HIV and AIDS information; information about HIV therapeutic, vaccine, microbicide, and other prevention trials; and information about HIV training programs.
- Expand access to and education about state-of-the-art treatment and patient management guidelines, including information on clinical trials, using multiple technologies such as online access and voice access (*AIDSinfo*).
- Widely disseminate information concerning specimen repositories, including existing repositories, specimens available, and relevant information concerning cohorts, contact information, and the process for obtaining access to samples.
- Collect, archive, and promote the use of existing data from NIH-supported basic and applied research for secondary data analysis, including rapid development of public use datasets that can be used for secondary data analysis in NIH-supported studies, especially baseline survey and HIV/STD (sexually transmitted disease) incidence data.
- Widely disseminate experimental findings regarding AIDS-related studies using nonhuman primates, as well as information concerning the availability of animals for AIDS-related studies.
- Improve current techniques and develop and evaluate new techniques for the two-way communication of information to scientific and lay audiences, particularly to hard-to-reach populations, including information about the importance of clinical trials participation, ongoing clinical trials, and trial results.
- Improve outreach and support access to AIDS information resources (including computers) by community groups, health care providers, and community-based AIDS service organizations, including those serving racial and ethnic populations.

- Work with community-based organizations (CBOs), nongovernmental organizations (NGOs), and local agencies to develop and promote effective methods of information dissemination on treatment, prevention, and research in target populations to increase awareness and clinical trial participation and to reduce stigma.

- Support dissemination of research findings to community representatives, study participants, health care practitioners, payers, policymakers, AIDS community organizations, and the public, in culturally and linguistically appropriate ways.

- Develop and disseminate educational information to enhance understanding of HIV and basic and clinical research processes by health care providers, community-based AIDS service organizations, social service organizations, policymakers, and persons with HIV and AIDS.

- Develop and disseminate information resources about HIV prevention, microbicide, vaccine, and treatment clinical trials, including cancer trials, to increase awareness about research in these areas and the importance of supporting and participating in clinical studies.

- Evaluate the effectiveness of communication efforts by appropriate means, including obtaining feedback from target audience members through methods such as usability testing of paper and computer interfaces (see www.usability.gov) and information dissemination intermediaries, such as journalists and health educators.

- Promote wide dissemination of the annual *Trans-NIH Plan for HIV-Related Research* and other HIV-related reports as they become available.

- Promote and enhance the exchange of scientific information and communication between public and private research enterprises, such as enhancing communication with the pharmaceutical industry concerning research on the development of therapeutics, vaccines, and microbicides, and working with industrial scientists to make information concerning basic science and HIV protein structures available to the general scientific community.

- Communicate and exchange information internationally on topics such as prevention and treatment; patient management, including comorbidities and prevention guidelines; and research results that improve the care of HIV-infected individuals, including those in developing countries.

- Support the exchange of basic and applied research information at community, regional, national, and international conferences and workshops.

- Support the cross-collaborations of HIV and AIDS information providers to develop more integrated and comprehensive information dissemination approaches.

- Provide support for online access to presentation materials and other information (e.g., slides, graphics, and plenary presentations) from scientific meetings.

- Develop HIV/AIDS training materials using a variety of current technologies most appropriate for specific audiences, as well as materials adapted for local languages.

OBJECTIVE–B: Develop New Communication Strategies

Support research to identify existing gaps in communication approaches, identify and evaluate existing strategies, and develop and test new and innovative communication strategies that will improve access to and use of state-of-the-art HIV information by all relevant target audiences, domestically and internationally.

STRATEGIES

- Continue to assess the changing information needs and resources used by various audiences, including biomedical and behavioral research communities, health care providers, service providers, persons living with HIV and their advocates, at-risk populations, scientific and lay media, and the general public.
- Identify obstacles to information dissemination and develop, test, and evaluate possible ways to overcome these obstacles.
- Develop, test, and evaluate innovative strategies for effectively reaching specific audiences (e.g., racial and ethnic populations, adolescents, drug users, other hard-to-reach populations, and health care providers) with relevant HIV information.
- Investigate how and under what circumstances different communication and dissemination strategies influence the adoption of scientifically based HIV behavior-change interventions and clinical practices in specific audiences.
- Promote the use of new technologies and evaluate their effectiveness for disseminating basic and clinical research findings.
- Work to reduce communication gaps between academic researchers and treatment providers so that research results are more effectively disseminated to providers and that research agendas reflect the needs of practicing clinicians.
- Work to facilitate effective dissemination and understanding of relevant prevention research results to HIV prevention workers and to those in community-based and other settings.

OBJECTIVE–C: Coordination and Collaboration Efforts

Develop, implement, and evaluate methods of coordination and collaboration on HIV/AIDS communication activities across NIH Institutes and Centers (ICs), among other Federal and non-Federal groups, and with international partners.

STRATEGIES

- Promote and foster information dissemination regarding research and programmatic efforts across the ICs, among U.S. Government agencies, and with international partners.
- Promote collaboration among all ICs in providing information about their HIV/AIDS clinical trials to *AIDSinfo* and *ClinicalTrials.gov*.
- Build and enhance partnerships among CBOs/NGOs and basic, clinical, and behavioral researchers to encourage exchange of information and experience.
- Continue collaborations with the Joint United Nations Programme on HIV/AIDS, the Pan American Health Organization, the International AIDS Society, and other international AIDS agencies or societies on information/communication efforts, including information about international clinical trials and training opportunities.
- Collaborate with public and health sciences libraries, health care providers, AIDS Education and Training Centers, and community-based HIV/AIDS service organizations to facilitate access to needed information and disseminate NIH HIV-related reports.
- Expand collaboration to include academic, medical, and other communities, as appropriate, in the dissemination of NIH HIV-related reports.
- Expand the development and sharing of HIV/AIDS resources on the Internet to facilitate national and international research collaboration and data sharing.